

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2005-136587

(43)Date of publication of application : 26.05.2005

(51)Int.Cl. H01Q 1/46

H01Q 9/30

H04B 1/18

(21)Application number : 2003-368862 (71)Applicant : NEC ACCESS TECHNICA LTD

(22)Date of filing : 29.10.2003 (72)Inventor : HARANO SHINYA

(54) ANTENNA APPARATUS

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an antenna apparatus integrated with an earphone which reduces the fluctuation of the impedance and gain of an antenna to the utmost and can obtain a satisfactory antenna characteristic when the earphone is used. SOLUTION: A branch part 12 is disposed in an intermediate position of earphone signal lines 19 and 15 for transmitting a sound signal from a connector part 11 to a reception part 13, and does not transmit the respective high frequency signals of a plurality of earphone signal lines but transmits the sound signal. The branch part 12 takes out an antenna reception signal received by an antenna element between the intermediate position and the reception part. A coaxial line 14 transmits the antenna reception signal taken out at the branch part to the connector part 11 by using a core wire 14.

LEGAL STATUS

[Date of request for examination] 08.10.2004

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

CLAIMS

[Claim(s)]

[Claim 1]

They are the earphone which is connected to a walkie-talkie by the connector area, transmits the sound signal given to this connector area from this walkie-talkie with two or more earphone signal lines, and utters voice from the receiver section, and antenna equipment constituted in one,

The tee which takes out the antenna input signal which are in a location in the middle of the earphone signal line which transmits said sound signal from said connector area to said receiver section, and did not make each RF signal of two or more of said earphone signal lines have a good understanding, but said sound signal was made to have a good understanding, and was received by this antenna element that is between said receiver sections from a location the middle,

Antenna equipment which has the coaxial line which transmits said antenna input signal taken out by said tee to said connector area with a core wire.

[Claim 2]

Antenna equipment according to claim 1 which whose previous earphone signal line and previous receiver section are the stereo mold of two right and left, and has said antenna element between said tee and said both receiver sections from said tee.

[Claim 3]

Antenna equipment according to claim 1 or 2 on which one between said tees and said receiver sections of earphone signal lines functions as said antenna element.

[Claim 4]

Antenna equipment according to claim 1 using the coaxial line of the structure along which shielding wire functions as said antenna element, and said earphone signal line passes as a core wire in this shielding wire between said tees and said receiver sections.

[Claim 5]

Said tee is antenna equipment given in any 1 term of claims 1-4 which has the matching circuit which takes impedance matching by the predetermined concentrated constant between said antenna elements and said coaxial lines.

[Claim 6]

Antenna equipment given in any 1 term of claims 1-4 which has further the stub circuit which takes impedance matching with a predetermined distributed constant between said antenna elements and said coaxial lines.

[Claim 7]

Antenna equipment given in any 1 term of claims 1-4 which has further the adjustment controller which takes impedance matching in the middle of said coaxial line.

[Claim 8]

Antenna equipment given in any 1 term of claims 1-7 with which said earphone signal line and said coaxial line are covered by the separate envelope between said connector areas and said tees.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[Field of the Invention]

[0001]

Especially this invention relates to the antenna equipment built in the earphone linked to a small walkie-talkie about the antenna equipment for small walkie-talkies.

[Background of the Invention]

[0002]

It is important to attain miniaturization of a device and lightweight-ization and to raise portability in the field of a small walkie-talkie.

[0003]

The earphone having an antenna may be used on pocket FM radio. If the earphone having an antenna is used, in order that there may be no need of forming an antenna separately, the portability of pocket FM radio will improve.

[0004]

By the earphone with a built-in antenna used for pocket FM radio, the cable of the previous whole earphone is used as an antenna from an earphone jack. The earphone cable used with a small walkie-talkie like pocket FM radio is usually about 1-2m. Therefore, the antenna built in the earphone tends to acquire a desired impedance and gain with a frequency band with long wavelength like a VHF band (wavelength is about 10m-1m).

[0005]

Moreover, what an earphone may be used also with a portable telephone and built the antenna in this earphone is indicated by the patent reference 1. The portable telephone indicated by the patent reference 1 makes it possible to put a portable telephone on the location of arbitration at the time of an earphone activity by forming an antenna in a head unit. Moreover, the portable telephone indicated by the patent reference 1 is the configuration which made switchable the antenna which has two antennas in a head unit and is connected to a portable telephone by the connecting cord with a switch. It is going to obtain sufficient field strength by choosing an antenna with good field strength.

[Patent reference 1] JP,04-200047,A

[Description of the Invention]

[Problem(s) to be Solved by the Invention]

[0006]

With pocket FM radio, a part of earphone cable may be used in the condition of having rolled round, or where a part is put into a pocket, it may be used. Such an activity may cause the impedance of an antenna with a built-in earphone, and fluctuation of gain, and may fully be unable to demonstrate effectiveness as an antenna.

[0007]

On the other hand, in the portable telephone indicated by the patent reference 1, the antenna formed in the head unit is connected to a portable telephone through a switch and a connecting cord. From the antenna in a head unit to [whole] a connecting cord is connected as considering a RF property, and it is visible, and functions as an antenna. Therefore, where a connecting cord is rolled round, it is used, or the impedance fluctuation and property degradation by being used in the condition of having put into the pocket or the bag arise.

[0008]

The object of this invention is offering the antenna equipment which can reduce the impedance of an antenna, and fluctuation of gain as much as possible, and can acquire a good antenna property at the time of an earphone activity.

[Means for Solving the Problem]

[0009]

In order to attain the above-mentioned object, they are the earphone which the antenna equipment of this invention is connected to a walkie-talkie by the connector area, transmits the sound signal given to this connector area from this walkie-talkie with two or more earphone signal lines, and utters voice from the receiver section, and antenna equipment constituted in one,

The tee which takes out the antenna input signal which are in a location in the middle of the earphone signal line which transmits said sound signal from said connector area to said receiver section, and did not make each RF signal of two or more of said earphone signal lines have a good understanding, but said sound signal was made to have a good understanding, and was received by this antenna element that is between said receiver sections from a location the middle,

It has the coaxial line which transmits said antenna input signal taken out by said tee to said connector area with a core wire.

[0010]

While transmitting the antenna input signal which received by the antenna element prepared in the previous part from the tee with a coaxial line from a tee to a connector area according to this invention, a tee removes the noise of the RF by capacity coupling between a coaxial line and an earphone signal line by there being nothing non-dense through about a RF signal.

[0011]

Moreover, a previous earphone signal line and the previous receiver section are the stereo mold of two right and left, and it is better than said tee also as said antenna element being between said tee and said both receiver sections.

[0012]

Therefore, the both sides of the earphone signal line between a tee and the right-hand side receiver section and the earphone signal line between a tee and the left-hand side receiver section function as a long antenna element.

[0013]

Moreover, it is good also as one between said tees and said receiver sections of earphone signal lines functioning as said antenna element.

[0014]

Therefore, an earphone signal line and an antenna element are made to common use.

[0015]

Moreover, it is good also as using the coaxial line of the structure along which shielding wire functions as said antenna element, and said earphone signal line passes as a core wire in this shielding wire between said tees and said receiver sections.

[0016]

Therefore, a sound signal and an antenna input signal are separable between a tee and the receiver section.

[0017]

Moreover, said tee is good between said antenna elements and said coaxial lines also as having the matching circuit which takes impedance matching by the predetermined concentrated constant. Or it is good between said antenna elements and said coaxial lines also as having further the stub circuit which takes impedance matching with a predetermined distributed constant.

[0018]

Therefore, the impedance matching of the core wire of a coaxial line and an antenna element is taken.

[0019]

Or it is good also as having further the adjustment controller which takes impedance

matching in the middle of said coaxial line.

[0020]

Therefore, an adjustment controller takes the impedance matching between a connector area and a tee.

[0021]

Moreover, it is good also as said earphone signal line and said coaxial line being covered by the separate envelope between said connector areas and said tees.

[Effect of the Invention]

[0022]

While transmitting the antenna input signal which received by the antenna element prepared in the previous part from the tee with a coaxial line from a tee to a connector area according to this invention Since the noise of the RF by capacity coupling between a coaxial line and an earphone signal line is removed when there is no tee non-dense through about a RF signal A wireless electric wave is receivable only in the part near [which is not placed into the condition of having been rolled round, or a pocket] the receiver section with a condition with little impedance fluctuation and gain lowering. And the effect on the sound signal by capacity coupling between a coaxial line and an earphone signal line can be removed, and good voice can be generated from the receiver section.

[0023]

Moreover, since the both sides of the earphone signal line between a tee and the right-hand side receiver section and the earphone signal line between a tee and the left-hand side receiver section function as an antenna element, long antenna element length can be taken and a better antenna property can be acquired.

[0024]

Moreover, since an earphone signal line and an antenna element are made to common use, the structure of antenna equipment can be simplified.

[0025]

Moreover, since a sound signal and an antenna input signal are separable between a tee and the receiver section, the noise to a sound signal can be reduced further.

[0026]

Moreover, since the impedance matching of the core wire of a coaxial line and an antenna element is taken, lowering of the gain produced by the mismatching of an impedance can be reduced.

[0027]

Moreover, the impedance matching of the core wire of a coaxial line and an antenna element is taken.

[0028]

Moreover, since an adjustment controller takes the impedance matching between a connector area and a tee, the impedance characteristic of the antenna seen from the connector area can be adjusted good.

[Best Mode of Carrying Out the Invention]

[0029]

The 1st operation gestalt of this invention is explained to a detail with reference to a drawing.

[0030]

Drawing 1 is drawing showing the configuration of the antenna equipment by the 1st operation gestalt. The antenna equipment of this operation gestalt is constituted in one with the earphone connected to a small walkie-talkie.

[0031]

if drawing 1 is referred to -- antenna equipment -- the earphone cable 10, a connector

area 11, a tee 12, and an earphone signal-line pair -- it has 15 and the receiver section 13. The connector area 11 and the tee 12 are connected by the earphone cable 10. a tee 12 and the receiver section 13 -- an earphone signal-line pair -- it connects by 15.

[0032]

the earphone signal-line pair which serves as the coaxial line 14 with which the earphone cable 10 consists of shielding-wire 14a and core wire 14b from earphone voice wire 19b and earphone GND line 19a -- it is the cable of the structure where 19 was covered by one envelope. The connector area 11 has antenna terminal 16a, antenna GND terminal 16b, earphone terminal 17a, and earphone GND terminal 17b. Earphone signal-line pair 15 consists of earphone voice wire 15b and earphone GND line 15a. The tee 12 has the RF separation section 18.

[0033]

Within the connector area 11, antenna terminal 16a is connected to core wire 14b, antenna GND terminal 16b is connected to shielding-wire 14a, earphone terminal 17b is connected to earphone voice wire 19b, and earphone GND terminal 17a is connected to earphone GND line 19a.

[0034]

Core wire 14b is connected to earphone voice wire 15b within the tee 12. The tee 12 side of shielding-wire 14a is opened. Moreover, earphone voice wire 15b and earphone voice wire 19b are connected through the RF separation section 18. Earphone GND line 15a and earphone GND line 19a are also connected through the RF separation section 18.

[0035]

The RF separation section 18 has inductor 18b in a serial between earphone voice wire 15b and earphone voice wire 19b, and has inductor 18a in the serial between earphone GND line 15a and earphone GND line 19a. The inductance value of Inductors 18a and 18b decides to become an impedance low enough on the frequency of a sound signal, and to become an impedance high enough on the frequency of the antenna input signal of a RF.

[0036]

a connector area 11 is inserted in the connector for an earphone-cum-antennas of a small walkie-talkie (un-illustrating) -- having -- the sound signal from a small walkie-talkie -- an earphone signal-line pair -- it tells 19 and the antenna input signal of the RF from a coaxial line 14 is told to a small walkie-talkie. The receiver section 13 has the loudspeaker, and the lug of the user of a small walkie-talkie is equipped with it, and it generates voice according to the given sound signal.

[0037]

the sound signal given from the small walkie-talkie between earphone terminal 17b and earphone GND terminal 17a -- an earphone signal-line pair -- 19, the RF separation section 18, and an earphone signal-line pair -- the receiver section 13 is reached through 15. Since a sound signal is low frequency, it passes the RF separation section 18. When a sound signal reaches the receiver section 13, voice is uttered from the receiver section 13.

[0038]

On the other hand, earphone voice wire 15b between a tee 12 and the receiver section 13 functions as an antenna element. The antenna input signal received by this antenna element is transmitted with a coaxial line 14, and is given to a small walkie-talkie from antenna terminal 16a. In addition, when earphone signal-line pair 19 is close in the coaxial line 14, capacity coupling happens there. however -- since Inductors 18b and 18a are inserted in the both sides of an earphone voice wire and an earphone GND line with this operation gestalt -- capacity coupling in earphone cable 10 part -- an earphone signal-line pair -- the RF signal produced in 19 is intercepted in the RF separation section 18, and does not flow to the receiver section 13 side.